resection of locally advanced lung cancer. *J Thorac Cardiovasc Surg*. 1995;110:386-95.
6. Ginsberg RJ, Hil LD, Eagan RT. Modern thirty day mortality of surgical resections in lung cancer. *J Thorac Cardiovasc Surg*. 1983; 86:654-8.
7. Bernard A, Deschamps C, Allen M, Miller D, Trastek V, Jenkins GD, Pairolero P. Pneumonectomy for malignant disease: factors affecting early morbidity and mortality. *J Thorac Cardiovasc Surg*. 2001;121: 1077-82.
8. Martin J, Ginsberg RJ, Abolhoda A, Bains MS, Downey RJ, Korst RJ et al. Morbidity and mortality after neoadjuvant therapy for lung cancer: the risks of right pneumonectomy. *Ann Thorac Surg*. 2001;72: 1149-54.
9. Bernard GR, Artigas A, Brigham KL, Carlet J, Falke K, Hudson L, et al. The American European Consensus Conference on ARDS. Definitions, mechanisms, relevant outcomes, and clinical trial coordination. *Am J Respir Crit Care Med*. 1994;149:818-24.
10. Dartevelle P, Macchiarini P, Chapelier A. Technique of superior vena cava resection and reconstruction. *Chest Surg Clin North Am*. 1995; 5:345-58.
11. Amato MB, Barbas CS, Medeiros DM, Magaldi RB, Schettino GP, Lorenzi-Filho G, et al. Effect of a protective-ventilation strategy on mortality in the acute respiratory distress syndrome. *N Engl J Med.* 1998;338:347-54.
12. Di Perna C, Wood DE. Surgical management of T3 and T4 lung cancer. *Clin Cancer Res*. 2005;11:5038s-44s.
13. Cetinkaya E, Turna A, Yldiz P, Dodurgali R, Bedirhan MA, Gurses A, et al. Comparison of clinical and surgical pathologic staging of the patients with non-small cell lung carcinoma. *Eur J Cardiothorac Surg*. 2002;22:1000-5.
14. Spaggiari L, Regnard JF, Magdeleinat P, Jauffret B, Puyo B, Levasseur P. Extended resections for bronchogenic carcinoma invading the superior vena cava system. *Ann Thorac Surg*. 2000;69:233-6.
15. Ratto GB, Costa R, Vassallo G, Alloisio A, Manieri P, Bruzzi P. Twelve-year experience with left atrial resection in the treatment of non-small cell lung cancer. *Ann Thorac Surg*. 2004;78:234-7.
16. Regnard JF, Perotin C, Giovanetti R, Sschussler O, Petino A, Spaggiari L, et al. Resection for tumor with carenal involvement: technical aspects, results and prognostic factors. *Ann Thorac Surg*. 2005;80: 1841-6.
17. Suzuki K, Asamura H, Watanabe S, Tsuchiya R. Combined resection of superior vena cava for lung carcinoma: prognostic significance of patterns of superior vena cava invasion. *Ann Thorac Surg*. 2004;78: 1184-9.
18. Winton T, Livingston R, Johnson D, Rigas J, Johnston M, Butts C, et al. Vinorelbine plus cisplatin vs. observation in resected non–small-cell lung cancer. *N Engl J Med*. 2005;352:2589-97.
19. Rosell R, Gomez-Codina J, Camps C, Maestre J, Padille J, Canto A, et al. A randomized trial comparing preoperative chemotherapy plus surgery with surgery alone in patients with non-small-cell lung cancer. *N Engl J Med*. 1994;330:153.
20. Roth JA, Fossella F, Komaki R, Ryan MB, Putnam JB Jr, Lee JS, et al. A randomized trial comparing perioperative chemotherapy and surgery with surgery alone in resectable stage IIIA non-small-cell lung cancer. *J Natl Cancer Inst*. 1994;86:673.
21. The Elderly Lung Cancer Vinorelbine Italian Study Group. Effects of vinorelbine on quality of life and survival of elderly patients with advanced non-small-cell lung cancer. *J Natl Cancer Inst*. 1999;91:66.
22. Leo F, Solli P, Veronesi G, Radice D, Floridi A, Gasparri R et al. Does chemotherapy increase the risk of respiratory complications after pneumonectomy? *J Thorac Cardiovasc Surg*. 2006;132:519-23.
23. Leo F, Solli P, Spaggiari L, Veronesi G, De Braud F, Leon ME, et al. Respiratory function changes after chemotherapy: an additional risk for post-operative respiratory complication? *Ann Thorac Surg*. 2004; 77:260-5.
24. Marino P, Preatoni A, Cantoni A. Randomized trials of radiotherapy alone versus combined chemotherapy and radiotherapy in stage IIIa and IIIb non-small cell lung cancer. A meta-analysis. *Cancer*. 1995; 76:593-601.
25. Dyszkiewicz W, Piwkowski C, Kasprzyk M, Ramlau R, Adamczak J, Pawlak K. Extended pneumonectomy for non small cell lung cancer: should we still do it? *Neoplasm*. 2004;51:150-4.

Discussion

Dr Wood. Dr. Veronesi, congratulations on very good work by you and your group on a complex group of patients. These are difficult patients, and you certainly got good results both in operative outcomes as well as in survival in a group of patients with advanced disease.

I wanted to emphasize a couple of points that were more in your paper than in the presentation. One was this aspect of clinical overstaging of T4 disease. In your series you found it 15% of the time. There is a series from about four years ago in the European Journal of Cardiothoracic Surgery that found clinical overstaging of T4 disease 40% of the time. I think that it is important to emphasize this experience since often a thoracic surgeon will not see these patients because they are clinically staged as T4 and felt to be unresectable. Or we may see them and deny surgical consideration for the same reason, yet they may really have T2-3 disease due to overstaging. This is one important aspect of looking at patients with locally advanced disease.

My first question is whether you think there really is a difference between T3 and T4 disease. You said that was a limitation of your study, but is there biologically any reason that there is a difference between T3 disease and T4 disease, and should we treat them any differently if we can achieve a complete resection?

Dr Veronesi. When I say limitation of the study, I mean that the group of chest wall resection and diaphragm resection doesn't reach the common definition of extended resections in literature definition. Nevertheless, I put this kind of patient in the work because we found that after pneumonectomy they also have a high rate of complications, so I think very aggressive surgery even in this case is T3 and T4, T3 diaphragm or chest wall. We included it for this reason, but the biologic difference I think is not so high, because in both cases I suggest induction chemotherapy. It may be that downstaging after chemotherapy may make a T4 become a T3 after surgical exploration.

Dr Wood. This is another place where we can educate our medical colleagues that we work with because they often consider T4 to be a contraindication to surgery and biologically the differentiation is arbitrary. It is arbitrary, based upon a historical surgical definition of what we can resect or not, and that is changing.

Your conclusions emphasized the importance of mediastinal staging and I couldn't agree with you more. The principles of success in lung cancer surgery are completeness of resection, which is more difficult in this group of patients, and nodal status. It does appear that if these patients also have advanced nodal status then they probably are not going to benefit from surgery. I agree completely with you in that regard.

I would respectfully disagree with you about the role of induction chemotherapy. Most of your patients had induction chemotherapy, which prevents you from being able to really compare the impact of not having induction chemotherapy or having it. The purported benefits are trying to decrease the extent of resection or improve resectability with negative margins and to treat potential systemic disease. These patients do need systemic therapy at some point in their treatment but not necessarily before surgery. Chemotherapy does create the problem of figuring out where the

margins should be because of the chemotherapy response around tumor. You also made the point that induction therapy increases morbidity and mortality in pneumonectomy, so I guess I would challenge you and question: do you really think that we should give these patients chemotherapy? We do not have strong evidence that it increases resectability. We do have strong evidence that it increases morbidity and mortality. Should we reconsider this conclusion from your paper?

Dr Veronesi. In another work we are going to publish, we found that induction chemotherapy increased morbidity but finally not mortality in pneumonectomy, so we had more than 50 pneumonectomies after chemotherapy. The other observation I can make is the few long-term survivals in this series had all received induction chemotherapy. I know that it is not significant from a statistical point of view but it is an observation.

Dr Wood. Yes, but all but nine of your patients had induction chemotherapy, so it would be hard for it to be otherwise.

Dr Veronesi. The fact that . . . (end of cassette)

Dr Wood. We recommend mediastinoscopy in all of these patients, not only for identifying nodal disease, but also for minimally invasive exploration of the mediastinum. Mediastinoscopy can help determine the extent of airway involvement or the extent of pulmonary artery involvement before committing the patient to a thoracotomy, as well as developing some of the tissue planes that are subsequently useful when you are doing a carinal resection. Are you doing mediastinoscopy at the time of the planned resection and do you find that same benefit in terms of staging the mediastinum not just for nodes but for extent of primary tumor?

Dr Veronesi. Not particularly. We use it mostly for nodal staging and when not positive we perform induction chemotherapy and then we don't perform a redo-mediastinoscopy, so usually it is a long period in advance compared with the surgery.

Dr Wood. Congratulations again on your work. Very nice presentation and nice paper. Thank you.

Dr Veronesi. Thank you.

Doctor [unidentified]. Thank you so much for giving me the opportunity to raise some questions. It was a fine presentation, but for me there remain three questions. The first one, you mentioned the combination of T3 and T4 patients is a weak point of your presentation. Why didn't you exclude T3 patients who have, as we all know, the much better prognosis? The second question is, you mentioned four T1 cases. How _____ to explain? And the third one, there begins really the atrial resection: all intrapericardial resections or where is exactly the border?

Dr Veronesi. I'll start with your final question. The resection was defined as resection not of the vein but of the wall of the atrium at the pathologic exam, so the muscle layer was present. I couldn't understand your second question, sorry. Could you repeat it?

Doctor [unidentified]. The second question is, you made a table with 4 cases in stage T1.

Dr Veronesi. One case. There was 1 case of stage T1.

Doctor [unidentified]. Why do you do an extended pneumonectomy for T1?

Dr Veronesi. It was a case that had a major response to chemotherapy, so we couldn't know the tissue viability before the surgery.

And the first question about T3 and T4, we discussed before with Dr. Wood.

Doctor [unidentified]. Yes, but T3 is quite another entity from T4. If you mix it, you ameliorate the prognosis of the patients of the _____ group. I don't know whether it is correct or not.

Dr Veronesi. Yes, but maybe some T3 were T4 before induction chemotherapy, so we never know that.

Dr Doty. I was taken by the sentence in the abstract, "Neither postoperative outcome nor survival were significantly influenced by the type of extended pneumonectomy." Just to give you a little perspective on this, my first experience over 40 years ago with the pneumonectomy was with the late George Lindesmith, and it was a large bronchogenic carcinoma originating in the right main bronchus deep in the mediastinum. I was really determined to have the opportunity to resect that lung, and George Lindesmith said to me, "You know, Don, getting out a lung cancer is always possible. It just depends on how hard you want to work, but it won't make any difference in the end." And so here we are with 23% survival in extended pneumonectomies 40 years later. It's kind of the same, isn't it? I mean have we really made any progress on this? I just leave you to answer that question. You don't have to. You're too young.

Dr Mulligan. Perhaps a question for the group to reflect upon.